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(54) **Electrical connector**

Elektrischer Verbinder

Connecteur électrique

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Description

Field of the Invention

[0001] This invention relates generally to electrical connectors and pertains more particularly to simplified and less expensive methods of manufacturing electrical connectors.

Background of the Invention

[0002] A widespread practice in electrical connector manufacture is to precisely dispose a plurality of contact members in positions mutually desired in the ultimate connector housing and then to precision mold the housing about the contact members. Given the precision in both the contact member disposition in the mold and in the precision of the mold itself, coplanarity of contact member contact portions relative to the housing in the ultimate connector is satisfactorily achieved.

[0003] A simpler and less costly practice in use is molding the housing and then inserting contact members in contact member receiving channels in the housing.

[0004] Examples of such practice are illustrated in US-A-4860445 and EP-A-408451, which both describe an electrical connector comprising a housing of electrically insulative material and contact members resident in the housing, in contact member receiving channels. In US-A-4860445, the contacts are pressed to the rear-most portion of the channels and set in place by ultrasonic welding. In EP-A-408451, the contact members are press-fitted in the channels, the problem addressed being avoidance of scrapings during insertion which might prevent the contact members from reaching the channel bases.

[0005] A problem, however, attends achieving coplanarity of contact member contact portions, i.e., where the preformed housing exhibits warping or bowing. Thus, the housing typically defines stop positions for inserted contact members. Where warping or bowing is at hand, the stop positions are not coplanar and the inserted contact members accordingly do not exhibit coplanarity.

Summary of the Invention

[0006] The present invention has as its primary object the achievement of contact member coplanarity in the face of warping or bowing in preformed connector housings.

[0007] The invention provides an electrical connector comprising a housing of electrically insulative material and contact members resident in said housing, said contact members defining contact portions and means for retaining said contact members in said housing, said housing having a plurality of channels, a distinct one of said contact members residing in each said channel,

and first and second slots in communication with each said channel, said contact member retaining means being resident in said first and second slots and retentively engaged with a side wall of each of said first and second slots, to permit variable positioning of said contact member retaining means in the housing, whereby said contact member contact portions may be coplanarly positioned in said housing irrespective of warp present in the housing.

[0008] The foregoing and other objects and features of the invention will be further understood from the following detailed description of preferred embodiments thereof and from the drawings, wherein like reference numerals identify like components throughout.

Description of the Drawings

[0009]

Fig. 1 is a rear perspective partial showing of an electrical connector in accordance with the invention.

Fig. 2 is a perspective view of a contact member of the Fig. 1 connector.

Fig. 3 is a side elevation of the contact member of Fig. 2.

Fig. 4 is a partial front elevation of the Fig. 1 connector.

Fig. 5 is a plan view of Fig. 4.

Detailed Description of the Preferred Embodiments

[0010] Referring to the partial showing of Fig. 1, connector 10 includes housing 12 comprised of electrically nonconductive material. Housing 12 defines a plurality of channels 14 opening into the upper surface of the housing, each channel being adapted for the receipt of contact member 16.

[0011] Contact members 16 are electrically conductive and are formed with upper contact portion 16a, wing portion 16b, having wings 16b-1 and 16b-2, lower contact portion 16c and connecting portion 16d, which connects wing portion 16b and lower contact portion 16c. Housing 12 is open rearwardly for receipt of contact members 16.

[0012] Slots 20 and 22 extend fully through housing 12, for purposes below discussed.

[0013] Referring to the showing of contact member 16 in Figs. 2 and 3, details thereof not seen in Fig. 1 are illustrated. Wings 16b-1 and 16b-2 will be seen to progress through arcuate sections to extend orthogonally of the plane of the contact member, tapering downwardly to free ends which support retention barbs 16b-3 and 16b-4, which extend sidewardly outwardly of the

planes of wings 16b-1 and 16b-2. Contact member portion 16c supports female contact member 18, one of its two mating contacts being indicated at 18a. Portion 16c and contact member 18 are mutually secured as indicated at 18b and 18c.

[0014] Turning to Figs. 4 and 5, slots 20 and 22 extend from wide openings at the rear of housing 12 to narrow width portions adjacent the front of housing 12, where they are bounded sidewardly by housing surface 22a and housing ledge surface 24a in the case of slot 20 and by housing surface 22b and housing ledge surface 24b in the case of slot 22.

[0015] In assembling connector 10, use is made of contact displacement plate 26 (Fig. 1), which has lower positioning fingers 26a, 26b. Contact members 16 are loaded into housing 12 rearwardly into channels 14 with wings 16b-1 and 16b-2 inserted into slots 20 and 22 at elevations such that all contact members can be engaged commonly atop contact portions 16a by plate fingers 26a, 26b. With the contact members so retentively seated in the housing, plate 26 is placed such that plate fingers 26a, 26b. engage the tops of contact portions 16a and the plate is advanced downwardly.

[0016] In the course of such plate movement, contact members 16, while retained in housing 12 by retention barbs 16b-3 and 16b-4, are forced further downwardly. Based on the geometry at hand, all tops of contact portions 16a are coplanar in disposition. The step of plate movement is such that plate 26 does not engage housing 12, whereby any warp or bowing in the housing does not affect coplanarity of the contact members.

[0017] Various changes in structure to the described apparatus and modifications in the described practices may evidently be introduced without departing from the invention as set forth in the following claims. Accordingly, it is to be understood that the particularly disclosed and depicted embodiments are intended in an illustrative and not in a limiting sense.

Claims

1. An electrical connector (10) comprising a housing (12) of electrically insulative material and contact members (16) resident in said housing (12), said contact members (16) defining contact portions (16a) and means (16b-3, 16b-4) for retaining said contact members (16) in said housing (12), said housing (12) having a plurality of channels (14), a distinct one of said contact members (16) residing in each said channel (14), and first and second slots (20, 22) in communication with each said channel, said contact member retaining means (16b-3, 16b-4) being resident in said first and second slots (20, 22) and retentively engaged with a side wall of each of said first and second slots (20, 22), to permit variable positioning of said contact member retaining means (16b-3, 16b-4) in the housing (12), whereby

said contact member contact portions (16a) may be coplanarly positioned in said housing irrespective of warp present in the housing.

2. The electrical connector claimed in claim 1, wherein each said contact member contact portion (16a) is at a free end of said contact member (16), said contact member (16) further including a wing portion (16b) distal from said contact member free end, said wing portion (16b) supporting said contact member retaining means (16b-3, 16b-4) at free ends thereof.
3. The electrical connector claimed in claim 2, wherein said contact member wing portions (16b) includes first and second wings (16b-1, 16b-2), said first and second wings (16b-1, 16b-2) being resident respectively in said first and second slots (20, 22).
4. The electrical connector claimed in claim 3, wherein said contact member retaining means comprises first and second barb members (16b-3, 16b-4) at ends of said first and second wings (16b-1, 16b-2) respectively.
5. The electrical connector claimed in any one of claims 2 to 4, wherein each said contact member (16) includes a further contact portion (16c) and a connecting portion (16d) connecting said further contact portion (16c) with said wing portion (16b) thereof.
6. The electrical connector claimed in claim 5 wherein said further contact portion (16c) is disposed orthogonally to said connecting portion (16d).

Patentansprüche

1. Ein elektrischer Verbinder (10) mit einem Gehäuse (12) aus elektrisch isolierendem Werkstoff und in dem Gehäuse (12) befindlichen Kontaktgliedern (16), die Kontaktabschnitte (16a) und Mittel (16b-3, 16b-4) zu ihrem Halten in dem Gehäuse (12) ausbilden, das eine Vielzahl von Durchgängen (14) aufweist, wobei jeweils ein anderes der Kontaktglieder (16) in jedem Durchgang (14) angeordnet ist und erste und zweite Schlitze (20, 22) mit jedem Durchgang in Verbindung stehen, die Kontaktgliedhaltemittel (16b-3, 16b-4) in den ersten und den zweiten Schlitzen (20, 22) angeordnet sind und mit einer Seitenwand von sowohl den ersten als auch den zweiten Schlitzen (20, 22) in haltender Anlage stehen zum Ermöglichen einer unterschiedlichen Positionierung der Kontaktgliedhaltemittel (16b-3, 16b-4) in dem Gehäuse (12), wodurch die Kontaktgliedkontaktabschnitte (16a) in dem Gehäuse unabhängig von einer in dem Gehäuse auftretenden Formänderung in einer Ebene liegend positioniert

werden können.

2. Der elektrische Verbinder wie in Anspruch 1 beansprucht, wobei jeder Kontaktgliedkontaktabschnitt (16a) an einem freien Ende des Kontaktgliedes (16) angeordnet ist, das Kontaktglied (16) weiter einen von seinem freien Ende abgelegenen Flügelabschnitt (16b) aufweist und dieser die Kontaktgliedhaltemittel (16b-3, 16b-4) an deren freien Enden abstützt. 5
3. Der elektrische Verbinder wie in Anspruch 2 beansprucht, wobei die Kontaktgliedflügelabschnitte (16b) erste und zweite Flügel (16b-1, 16b-2) enthalten und diese in den ersten bzw. zweiten Schlitzen (20, 22) angeordnet sind. 10
4. Der elektrische Verbinder wie in Anspruch 3 beansprucht, wobei das Kontaktgliedhaltemittel an Enden der ersten bzw. der zweiten Flügel (16b-1, 16b-2) erste und zweite Widerhakenglieder (16b-3, 16b-4) aufweist. 15
5. Der elektrische Verbinder wie in irgendeinem der Ansprüche 2 bis 4 beansprucht, wobei jedes Kontaktglied (16) einen weiteren Kontaktabschnitt (16c) und einen den weiteren Kontaktabschnitt (16c) mit dessen Flügelabschnitt (16b) verbindenden Verbindungsabschnitt (16d) aufweist. 20
6. Der elektrische Verbinder wie in Anspruch 5 beansprucht, wobei der weitere Kontaktabschnitt (16c) unter einem rechten Winkel zu dem Verbindungsabschnitt (16d) angeordnet ist. 25

Revendications

1. Connecteur électrique (10) comprenant un boîtier (12) formé d'un matériau électriquement isolant et d'éléments de contact (16) qui sont situés dans ledit boîtier (12), lesdits éléments de contact (16) définissant des parties de contact (16a) et des moyens (16b-3, 16b-4) pour retenir lesdits éléments de contact (16) dans ledit boîtier (12), ledit boîtier (12) possédant une pluralité de canaux (14), un élément distinct faisant partie desdits éléments de contact (16) résidant dans chacun desdits canaux (14), et des première et seconde fentes (20, 22) en communication avec chacun desdits canaux, lesdits moyens (16b-3, 16b-4) de retenue des éléments de contact étant situés dans lesdites première et seconde fentes (20, 22) et coopérant d'une manière qui les retient engagés avec une paroi latérale de chacune desdites première et seconde fentes (20, 22) pour permettre un positionnement variable desdits moyens (16b-3, 16b-4) de retenue des éléments de contacts dans le boîtier (12), ce qui a pour effet que 40

lesdites parties de contact (16a) des éléments de contact peuvent être positionnées d'une manière coplanaire dans ledit boîtier indépendamment d'une déformation présente dans le boîtier.

2. Connecteur électrique selon la revendication 1, dans lequel ladite partie de contact (16a) des éléments de contact est située sur une extrémité libre dudit élément de contact (16), ledit élément de contact (16) comprenant en outre une partie formant aile (16b) qui est distale par rapport à ladite extrémité libre des éléments de contact, ladite partie formant aile (16b) supportant lesdits moyens (16b-3, 16b-4) de retenue des éléments de contact sur leurs extrémités libres.
3. Connecteur électrique selon la revendication 2, dans lequel lesdites parties formant ailes (16b) des éléments de contact incluent des première et seconde ailes (16b-1, 16b-2), lesdites première et seconde ailes (16b-1, 16b-2) étant situées respectivement dans lesdites première et seconde fentes (20, 22).
4. Connecteur électrique selon la revendication 3, dans lequel lesdits moyens de retenue des éléments de contact comprennent des premier et second éléments en forme de barbes (16b-3, 16b-4) au niveau d'extrémités respectivement desdites première et seconde ailes (16b-1, 16b-2).
5. Connecteur électrique selon l'une quelconque des revendications 2 à 4, dans lequel chacun desdits éléments de contact (16) comprend une autre partie de contact (16c) et une partie de connexion (16d) connectant ladite autre partie de contact (16c) à ladite partie formant aile (16b) de cet élément de contact.
6. Connecteur électrique selon la revendication 5, dans lequel ladite autre partie de contact (16c) est disposée perpendiculairement à ladite partie de connexion (16d). 50

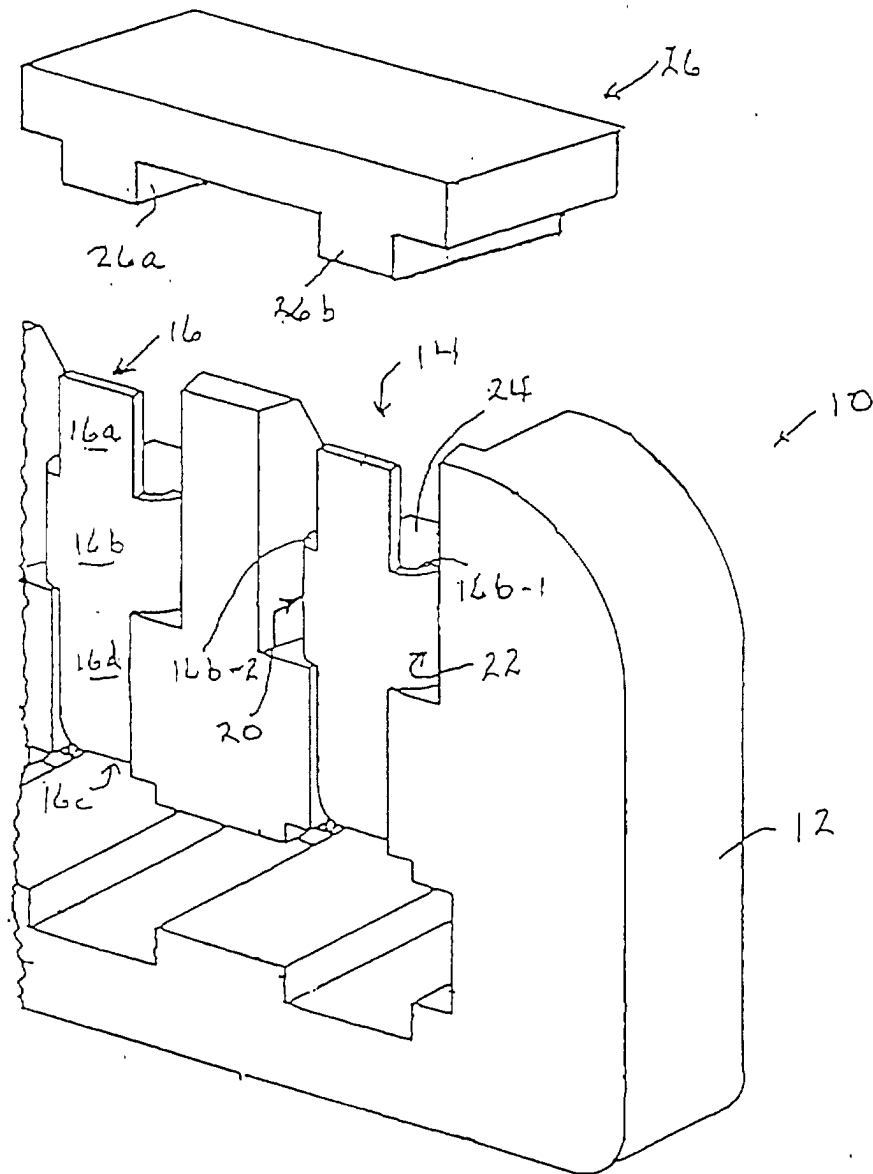
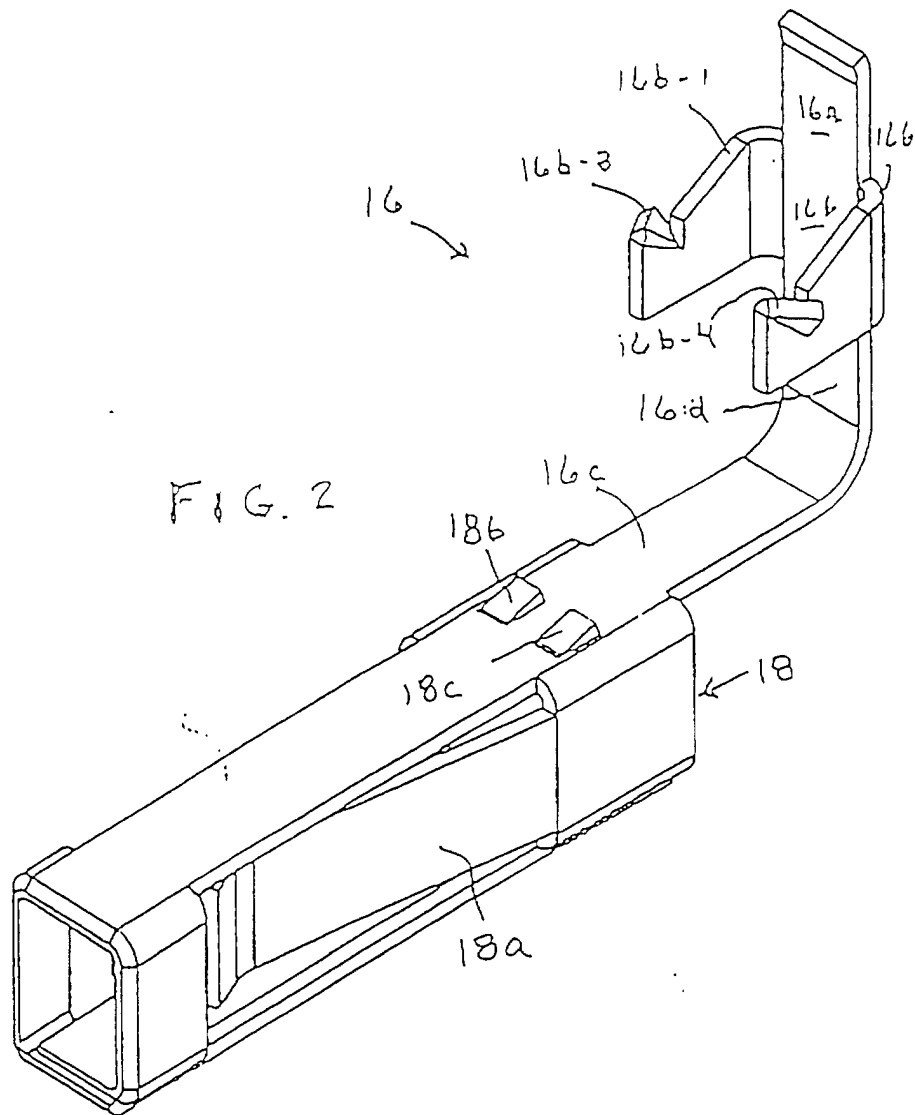


FIG. 1



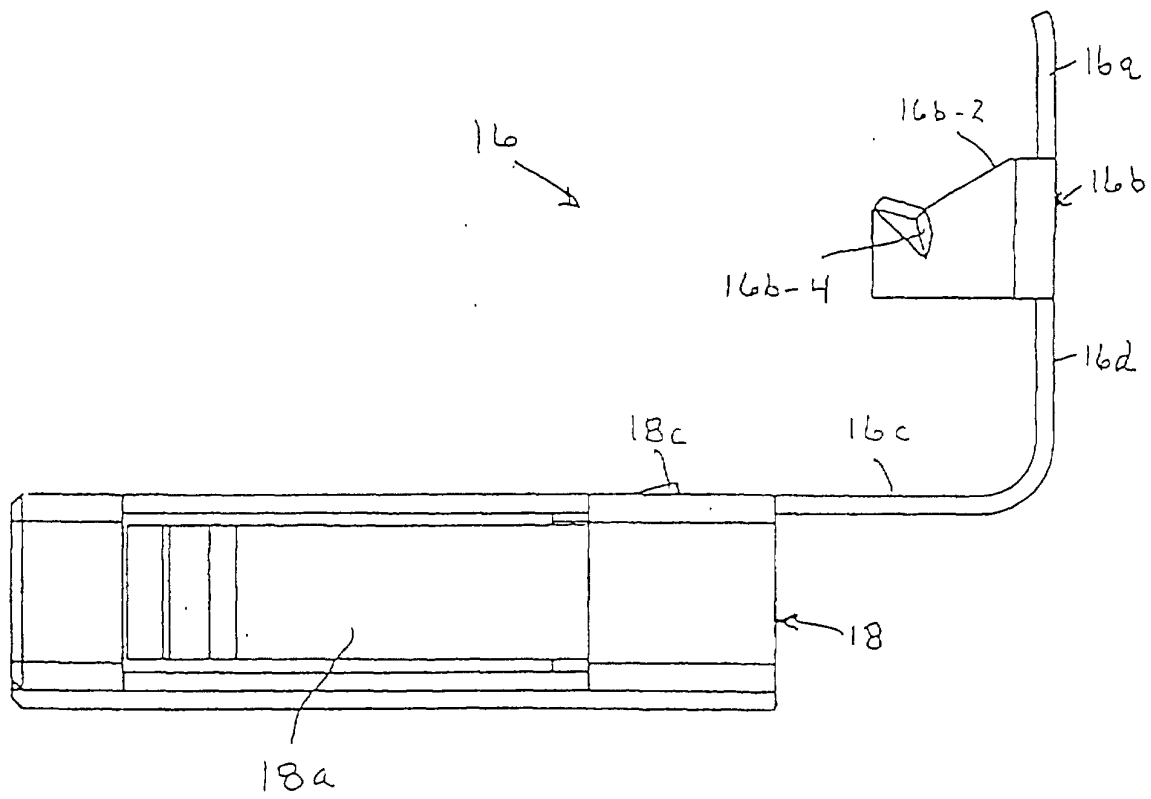


FIG. 3

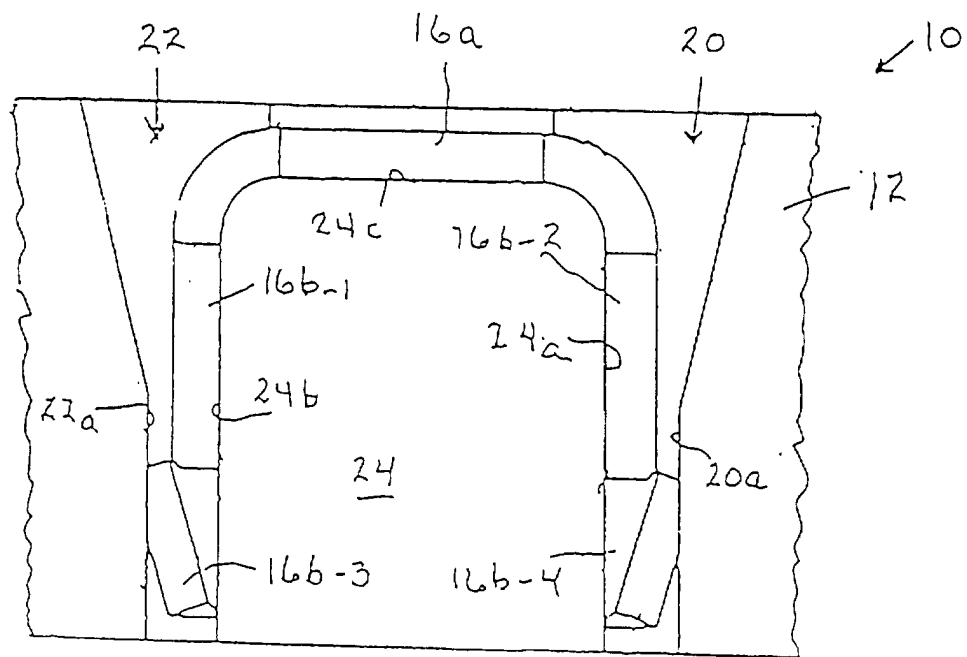


FIG. 5

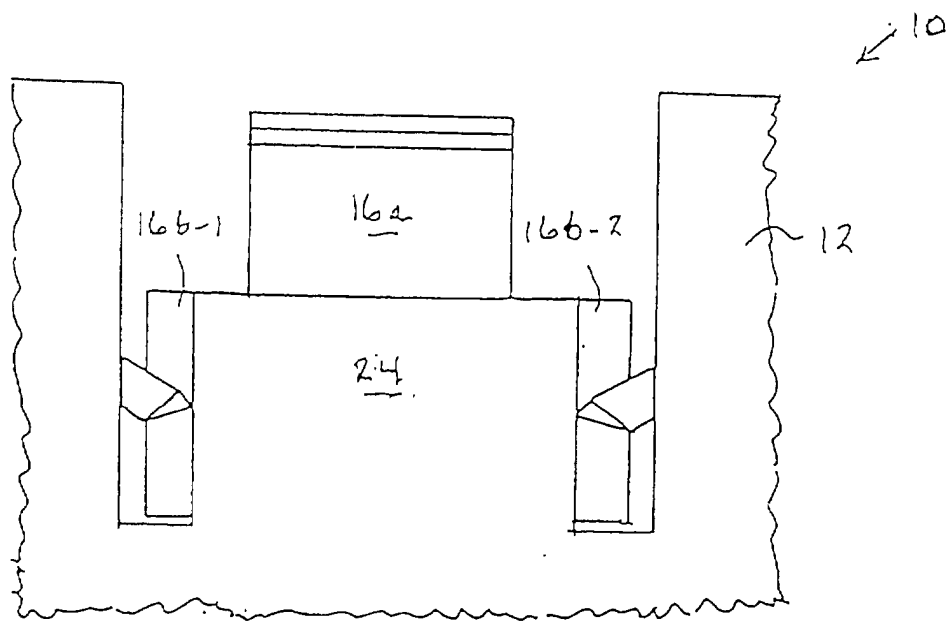


FIG. 4